Levels of Protection (May 29, 2019)

Alternative 1. The model-derived water-column criteria will provide a level of protection expected to ensure that **the maximum value of any individual of any species in the lake** will not exceed the BC egg-ovary guideline of 11.0 mg Se/kg.

Alternative 2. The model-derived water-column criteria will provide a level of protection ensuring that **the *population mean for any species in the lake*** will not exceed the BC egg-ovary guideline of 11.0 mg Se/kg.

Alternative 3. The model-derived water-column criteria will provide a level of protection expected to ensure that **the maximum value of any individual of any species in the lake** will not exceed the USEPA egg-ovary criterion of 15.1 mg Se/kg.

Alternative 4. The model-derived water-column criteria will provide a level of protection expected to ensure that **the *population mean of any species in the lake*** does not exceeds the USEPA egg-ovary criterion of 15.1 mg Se/kg.

Alternative 5. The model-derived water-column criteria will provide a level of protection expected to ensure that **the population mean value for any species in the lake** will not exceed the BC whole-body and muscle tissue guidelines of 4.0 mg Se/Kg.

Alternative 6. The model-derived water-column criteria will provide a level of protection expected to ensure that **the population mean value for any species in the lake** will not exceed the USEPA whole-body and muscle tissue guidelines of 8.5 mg Se/Kg.

RATIONALE & NOTES:

There is uncertainty regarding whether the current criteria/guideline are protective of individuals or even populations of species in Koocanusa Reservoir, despite statements that they are intended to protect those valued ecological components.

Alt #1: The BC egg-ovary guideline has not been *applied* as an individual maximum value. However, this alternative is consistent with BC's guiding principle to protect individuals. It incorporates a 2X uncertainty factor applied to results of chronic effect studies in the literature.

Alt #2: This is consistent with how the BC egg-ovary guideline is *applied*, i.e. as a sample mean.

Alt #3: This directs the modellers to translate EPA's national criterion as a maximum for any individual fish in the reservoir. Because this is a lower concentration than the lowest EC10 for any species in the reservoir, we can reasonably expect this to translate to a water column concentration related to less than 10% effect on individual fish from any species in the lake.

Alt #4: This directs the modellers to translate EPA's national criterion as a population mean for any species in the reservoir. This is consistent with the compliance approach under Idaho's proposed Egg-Ovary criteria in which an average or composite sample of at least five individuals of the same species is compared to the criteria/standard.

Alt #5: Proposing an alternative which explicitly protects against muscle/whole-body tissue contamination and meets the Health Canada screening values for High fish intake (7.3 ug/g dry weight). USFWS expressed that this concentration and metric falls below the level they would expect any effect to occur (i.e. a NOEC).